U.S. Department of Commerce
Juanita M. Kreps
Secretary

National Bureau of Standards
Ernest Ambler, Director

National Bureau of Standards

Certificate of Analysis

Standard Reference Material 58a

Ferrosilicon (73% Si - Regular Grade)

(In cooperation with the American Society for Testing and Materials)

This SRM* is in the form of fine powder and is intended for use both in checking chemical methods of analysis and in calibration with instrumental methods of analysis.

Constituent	Si	Fe	C	Mn	P	S	Cu	Ni	Cr	B	Zr	Ti	Al	Ca	Co
Certified Value, % by wt.[1]	73.20	25.23	0.014	0.16	0.009	<0.002	0.024	0.012	0.020	0.0010	0.002	0.051	0.95	0.30	<0.01
Estimated Uncertainty[2]	0.07	0.03	0.003	0.01	0.001	---	0.002	0.001	0.001	0.0001	0.001	0.002	0.01	0.02	---
Method / Lab		$SnCl_2$-$K_2Cr_2O_7$	Chromato-graphic	Photometric	Photometric	Combustion-Titration	Photometric			Photometric	Photometric	Photometric			
1	[a] 73.15 [b] 73.23	25.23	---	[c] 0.16	---	---	[d] 0.022	[d] 0.012	[e] 0.019	[d] 0.0010	---	---	---	---	---
2	[a] 73.13	25.28	[f] 0.017	.17	0.009	---	[g] .025	[h] .012	[e] .021	[i] .0010	[j] 0.002	[k] 0.052	[l] 0.95 [h] .93	[m] 0.29 [h] .31	---
3	[n] 73.26	25.20	.016	.16	.009	<0.002	[o] .026	[p] .011	[q] .020	[r] .0010	[s] .001	[k] .050	[h] .94 [l] .96	[h] .31 [t] .28	[i] <0.01
4	73.24	25.20	.011	[h] .16	.010	[u] <.002	[h] .023	[h] .014	[h] .020	[v] .0010	.002	[k] .051	[h] .95	[h] .28	[h] <.01
5	[n] 73.18	25.21	.013	---	---	<.002	---	---	---	---	---	---	[l] .96	---	---
6	---	---	---	[w] .16	---	---	---	---	---	---	---	---	[l] .95	[x] .31	---

[1] The certified value listed for a constituent is the present best estimate of the "true" value based on the results of the cooperative program for certification.

[2] The estimated uncertainty listed for a constituent is based on judgment and represents an evaluation of the combined effects of method imprecision, possible systematic errors among methods, and material variability for samples 0.5 g or more. (No attempt was made to derive exact statistical measures of imprecision because several methods were involved in the determination of most constituents.)

[a] 0.5 g sample fused with Na_2O_2, dehydration with HCl.
[b] 0.5 g sample fused with Na_2CO_3+KNO_3, dehydration with HCl. Soluble silica determined photometrically.
[c] Peroxydisulfate-arsenite titration.
[d] Isotope dilution, mass spectrometry.
[e] Peroxydisulfate oxidation, titration with ferrous ammonium sulfate.
[f] Combustion-conductometric.
[g] Neocuproine photometric.
[h] Atomic absorption spectrometry.
[i] Emission spectrometry.
[j] Ion-exchange, phenylfluorone photometric.
[k] H_2O_2 photometric.
[l] Gravimetry.
[m] Calcium precipitated as the oxalate and titrated with $KMnO_4$.
[n] Dehydration with $HClO_4$.
[o] Diethyldithiocarbamate photometric.
[p] KCN-$AgNO_3$ titration.
[q] Diphenylcarbazide photometric.
[r] Azure C photometric.
[s] X-ray spectrometry.
[t] EDTA titration.
[u] Combustion, pararosaniline photometric.
[v] Curcumin complex photometric.
[w] Bismuthate method.
[x] Calcium precipitated as the oxalate and weighed.

*A companion material, SRM 195, Ferrosilicon (75% Si - High-Purity Grade), also is available.

Washington, D.C. 20234
April 25, 1978
(Revision of Certificate 1/7/76)

(over)

J. Paul Cali, Chief
Office of Standard Reference Materials

PLANNING, PREPARATION, TESTING, ANALYSIS: Based on documented needs, two SRM's for the 75% ferrosilicon grade were planned; this renewal, SRM 58a, Regular Grade, and a new SRM 195, High-Purity Grade.

The material for this Standard was supplied by the Tennessee Alloys Corporation and pulverized (<0.15 mm) by the Union Carbide Corporation, Ferroalloys Division.

Following sieving and blending operations at NBS, homogeneity testing was performed by S. D. Rasberry, J. McKay and D. Reid (x-ray fluorescence analyses); and by K. M. Sappenfield (chemical analyses). Selected samples representative of the lot were analyzed and no significant material variability was observed when using samples 0.5 g or larger.

Cooperative analyses for certification were performed in the analytical laboratories of Allegheny Ludlum Steel Corporation, Research Center, Brackenridge, Pennsylvania, R. B. Fricioni and M. A. McMahon; Armco Steel Corporation, Research Center, Middletown, Ohio, M. Dannis, E. C. Schmidt, and R. J. Bendure; Carpenter Technology Corporation, Reading, Pennsylvania, A. L. Sloan; Interlake, Inc., Globe Metallurgical Division, Beverly, Ohio, J. C. Cline and R. A. Pontello; Union Carbide Corporation, Ferroalloys Division, Marietta, Ohio, H. H. Hall, J. J. Armour,and G. Porter.

Analyses were performed in the NBS Analytical Chemistry Division by K. M. Sappenfield, E. L. Garner, and R. K. Bell.

Final certification was under the auspices of the ASTM-NBS Research Associate Program.

In the course of chemical characterization in the Industry-ASTM-NBS cooperative program, additional information on some constituents was provided. Although *not certified*, information on the constituents is given below:

Element	Percent by Weight Not Certified
Oxygen	(0.20)
Molybdenum	(.01)
Arsenic	(.0020)
Vanadium	(.002)
Tin	(<.005)
[Total, by difference	(100.1)]

The overall direction and coordination of the technical measurements at NBS leading to certification were performed under the direction of O. Menis and J. I. Shultz.

The technical and support aspects involved in the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by R. E. Michaelis.

NOTE: A selected portion of this ferrosilicon material was sent to the Bundesanstalt Für Materialprufung, Berlin, Germany, to aid standardization in Germany, and to promote international standardization.